

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

ORIGINAL  
RECEIVED

OCT 28 1996

In the Matter of

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

Amendment of Part 90 of the Commission's Rules )  
To Provide For the Use of the 220-222 MHz )  
Band by the Private Land Mobile )  
Radio Service )

PR Docket No. 89-552  
RM 8506

Implementation of Sections 3(n) )  
and 332 of the Communications Act )

GN Docket No. 93-252

Regulatory Treatment of Mobile Services )

DOCKET FILE COPY ORIGINAL

Implementation of Section 309(j) of the )  
Communications Act-Competitive )  
Bidding, 220-222 MHz )

PP Docket No. 93-252

JOINT SUPPLEMENTAL COMMENTS OF  
COMTECH, INC., RUSH NETWORK CORP.,  
GLOBAL CELLULAR CORP., and  
OVERALL WIRELESS COMMUNICATIONS CORPORATION  
ON CHANNEL AGGREGATION AND SPECTRAL EFFICIENCY

I. INTRODUCTION

ComTech, Inc., Rush Network Corp., Global Cellular Corp., and Overall Wireless Communications Corporation (the "Joint Commenters") hereby submit the following Supplemental Comments in the above referenced proceeding in which the Federal Communications Commission ("FCC" or "Commission") has proposed a new licensing scheme for the band 220-222 MHz.<sup>1</sup>

<sup>1</sup> The Joint Commenters recognize that the deadlines for the submission of Comments and Reply Comments are long past. As noted below, the Joint Commenters believe the Commission has not

No. of Copies rec'd  
List ABCDE

24

In this proceeding,<sup>2</sup> the FCC has proposed to allow licensees to aggregate 5 kHz channels.<sup>3</sup> However, mindful that this spectrum was intended as a testbed for narrowband technology, the Commission proposed that licensees choosing to aggregate channels maintain a spectral efficiency at least equivalent to that obtained through 5 kHz channelization,<sup>4</sup> but did not define a particular spectral efficiency equivalency standard at which technologies employing other than 5 kHz channelization would be evaluated. Each of the Joint Commenters holds a nationwide license covering the operation of five contiguous 220 MHz channels and will be affected by the Commission's determination of how spectral efficiency will be determined. Accordingly, the Joint Commenters here address this issue and recommend in Section II-C hereto, a methodology for the Commission to evaluate whether a licensee proposes the use of a spectrally efficient technology.

## II. COMMENTS

### A. Channel Aggregation

In the NPRM, the Commission tentatively concluded that it is not necessary to continue to provide that 5 kHz technology be utilized in the 220 MHz band to the

---

adequately addressed the issue of spectrum efficiency in the context of channel aggregation. Accordingly, the Joint Commenters have requested, in a separate pleading, that the Commission accept these Supplemental Comments as either late filed or as an *ex parte* statement.

<sup>2</sup> *Amendment of Part 90 of the Commission's Rules to Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Services, Second Memorandum Opinion and Order and Third Notice of Proposed Rule Making*, 11 FCC Rcd 188 (1995) ("NPRM").

<sup>3</sup> NPRM at paras. 80-84.

<sup>4</sup> NPRM at para. 83.

exclusion of all other technologies<sup>5</sup> and that both Phase I and Phase II licensees should be permitted to aggregate their contiguous channels to create wider bandwidth channels.<sup>6</sup> The Joint Commenters strongly agree with this proposal. Because the Commission intends to license 220 MHz spectrum through the bidding process, and because the FCC has found that the 220 MHz band will presumptively be used to provide commercial mobile radio service ("CMRS")<sup>7</sup>, licensees should be permitted the same latitude as other competitive services to aggregate channels and use a variety of technologies.<sup>8</sup>

**B. A Strict Spectral Efficiency Standard Will Not Promote New Services**

A significant benefit to permitting licensees to aggregate their channels is the ability of those licensees to offer innovative services attractive to the wireless consumer base. In the NPRM, the Commission stated: "While our proposals for Phase II licensing of the 220 MHz band will not preclude the continued use of spectrally efficient 5 kHz technology, they will not mandate the types of technology that will be used and the services that will be offered. Thus, we believe that it is incumbent upon us to go

---

<sup>5</sup> NPRM at para 80

<sup>6</sup> NPRM at para 82

<sup>7</sup> *Part 90 Licensees Subject to Reclassification as Commercial Mobile Radio Service Providers on August 10, 1996*, Public Notice, 11 FCC Rcd 9267 (1996).

<sup>8</sup> *Amendment of Part 90 of the Commission's Rules to Facilitate the Future Development of SMR Systems in the 800 MHz Frequency Band*, First Report and Order, Eighth Report and Order, and Second Further Notice of Proposed Rule Making, 11 FCC Rcd 1463, ¶ 14 (1995) ("[C]ontiguous spectrum is an essential component of the wide-area licensing proposal . . . because it will give licensees the flexibility to use technologies that can operate on either contiguous or non-contiguous spectrum. Significantly, licensees' technological options are considerably more limited under a predefined channelization plan.").

forward with our Phase II plan so that such more widespread and varied 220 MHz services can be made available to the American Public.”<sup>9</sup>

The proposal not to mandate technology choices is consistent with the approach already adopted in competitive CMRS services such as PCS and 800 MHz and 900 MHz SMR. However, the Commission’s objective will be compromised if the standards adopted are either not technically viable in this band or so restrictive as to dissuade manufacturers and thereby system operators from fulfilling the Commission’s intent of promoting widespread and varied 220 MHz services.

The Joint Commenters are confident that the marketplace will ensure that equipment used in the 220-222 MHz band is both spectrally efficient and responsive to consumer requirements. The FCC has determined that the 220-222 MHz band will be employed primarily by CMRS licensees. As providers of commercial services, they have every incentive to ensure that the spectrum for which they are licensed is used by as many customers as possible. Conversely, unnecessarily rigid FCC regulations may unwittingly exclude certain technologies that would otherwise advance the FCC’s goals and the public interest. When standards are set beyond current commercially available technologies, spectrum is not put to use, which results in the poorest possible spectral efficiency and disservice to the public. Accordingly, the Commission must have a flexible approach to determining if licensees are achieving spectral efficiency.

---

<sup>9</sup> NPRM at para 56.

A strict spectral efficiency standard may unnecessarily preclude the use of technology that can actually provide service to more customers than current 5 kHz technology. This effect is particularly true for nationwide or regional licensees who are required to reuse their authorized channels in order to provide the coverage intended by their authorizations. Accordingly, for these licensees, the technology selected must provide for either simulcasting or frequency re-use to maximize the use of the available frequencies by providing contiguous coverage over a wide area. Without this technology, a nationwide or regional system acts as a series of isolated local systems that merely provide local coverage. Even with these "isolated local systems," using nationwide or regional contiguous channels, competitive local coverage can not be implemented.

For example, a licensee with one five channel repeater in Washington D.C. and one in Baltimore might operate on channels 220.1275 MHz through 221.1475 MHz (26 through 30). A customer operating a mobile unit might require service in Annapolis and would transmit on the frequency 221.1275 MHz. Repeaters in both Washington D.C. and Baltimore would receive the transmitted information sent from the mobile on frequency 220.1275 MHz. The repeaters would then simultaneously transmit to the mobile unit. Since the transmission from both repeaters are on the same frequency but not simulcasted, the mobile will receive two responses that are out of phase with each other. This will cause signal cancellation at the mobile unit and result in lack of service. The only way to prevent this result is to

ensure that the system in Washington does not use the same channel at the same time as the system in Baltimore.

Other CMRS services solve this problem by having different channels in use in different areas. However, because of the limited number of channels available at 220-220 MHz, typical reuse technology is not available for licensees in that band, and the dynamic frequency reuse technology that could overcome this problem is not presently available in the 220 MHz band. The Commission's rules concerning spectral efficiency must be flexible enough to accommodate technology that will address this problem.

In the NPRM, the Commission stated that the 220 MHz band is well suited to providing two-way land mobile services. However, it also tentatively found that the regulations should be flexible enough to allow operators to provide other services as well. The Joint Commenters agree with this approach and commend the Commission for allowing the marketplace to determine which services are appropriate for this band. For example, the Commission specifically proposed to permit licensees to offer paging services in the 220-222 MHz band noting that paging is a rapidly growing service and should be available at 220 MHz band, if customers desire that service.

However, a strict spectral efficiency standard may be irreconcilable with the provision of competitive services other than local, two-way dispatch. For instance, Flex™ is advertised as the most efficient, commercially available technology in one way paging. It currently employs frequency modulation in a 25 kHz bandwidth, but has the

capability of 1600, to a maximum of 6400, baud transmission. At its lowest commercially available data rate of 1600 baud, Flex will support approximately 150,000 numeric subscribers. At a Flex™ 6400 baud data rate, approximately 600,000 numeric subscribers can be served from a single transmitter.

Similarly, Inflexion™ appears to be the most efficient technology in voice/acknowledgment and two way paging. In a typical major metropolitan market, Inflexion™ technology can provide contiguous coverage for approximately 35,000 voice subscribers using 50 kHz of bandwidth. Even using older analog technology, voice paging provided the capacity for 1200 subscribers per 25 kHz of bandwidth. By comparison, the current ACSB 220 MHz narrowband technology will support approximately 1000 subscribers using 50 kHz (10 - 5 kHz channels).

Despite the number of customers that these technologies could support, overly stringent spectral efficiency standards could preclude their use at 220-222 MHz. The Commission is well aware of the time and resource commitment required to develop and manufacture technically sophisticated, spectrally efficient equipment even if the technology has already been developed for other bands with more flexible technical requirements. Unless manufacturers can be confident that their equipment will be able to meet the FCC's requirements, including availability in time to satisfy construction requirements, they will forego the 220 MHz band for other opportunities. For example, the development of Flex™ began during the early 1990s and required many years for

the technology to become commercially available. Accordingly, the Commission must ensure that any spectral efficiency standard adopted will accommodate today's technology.

### **C. Proposed Approach**

The Joint Commenters acknowledge the Commission's original intent for 220 MHz SMR service and understand the Commission's desire to continue to be spectrally efficient in this band and provide a genuine opportunity to test narrowband technology in the marketplace. Nevertheless, as demonstrated above, a strict spectral efficiency standard may not accommodate the technology necessary to: 1) operate systems in the 220-222 MHz band efficiently today; and 2) permit other technologies, as contemplated by the FCC, to operate in the band. Therefore, the Joint Commenters propose that the Commission adopt the following position in the Report and Order adopted in this proceeding:

We proposed in the NPRM that licensees who choose to aggregate channels must maintain a spectral efficiency at least equivalent to that obtained through five kHz channelization. In the past, we adopted a standard of one voice channel per 6.25 kHz of authorized bandwidth, or 4800 bps per 6.25 kHz of authorized bandwidth, to evaluate whether technology was operating in a manner comparably efficient to 6.25 kHz technology.<sup>10</sup> That standard will be applicable for systems in the private land mobile radios services ("PLMRS"). Such PLMRS systems typically operate using two way dispatch configuration. Accordingly, for systems that propose two way dispatch operations, we will judge spectral efficiency using this standard. Because we have maintained the channelization scheme for local trunked systems, we also presume that those systems will be operated in a two-way dispatch. Accordingly, we will expect that all licensees

---

<sup>10</sup> Replacement of Part 90 with Part 88 to Revise the Private Land Mobile Radio Services, Report and Order and Further Notice of Proposed Rule Making, 10 FCC Rcd 10076, ¶ 97 (1995).



operating on non-contiguous local channels operate on either 5 kHz channels, or use spectrally efficient technology, defined consistent with our approach in Docket No. 92-235.

However, in order not to discourage the use of other spectrally efficient technologies that may not conform to the definition we adopted in Docket No. 92-235, and to accommodate the use of paging technologies which we have permitted in this proceeding, we will permit licensees who have been authorized for channels that are licensed in a contiguous fashion wide latitude in demonstrating that the technology they choose to employ is as spectrally efficient as 5 kHz technology. We note that our rules specifically exempt paging operators from the efficiency standards we established in Docket No. 92-235. In this Report and Order, we have amended our rules to permit licensees in the 220-222 MHz band to offer paging services. Accordingly, consistent with our approach in Docket No. 92-235, licensees using contiguous spectrum may offer any form of paging services, employing currently available technology, and presumptively meet our efficiency standard. We expect that other licensees may be able to demonstrate that although they may not meet the type of efficiency standard established in Docket No. 92-235, they can operate efficiently through the use of, for example, compression technologies, frequency reuse, or other methods.

We believe that this approach accomplishes our intent of allowing 5 kHz technology to flourish in the 220-222 MHz band. One half of the channels in the band will be subject to a strict spectral efficiency standard. While we expect much of the remainder of the band to be used for 5 kHz technology as well, we have provided sufficient flexibility to allow licensees to demonstrate that the technology they propose to employ will be consistent with our goals for this band.

The Joint Commenters believe that such an approach by the Commission would accomplish the goal of promoting spectral efficiency, while recognizing the commercial realities that dictate the use of a flexible approach to technology assessment.

### **III. CONCLUSIONS**

The Joint Commenters propose that the Commission recognize that spectral efficiency can occur in a variety of fashions. Accordingly, they offer an approach consistent with that which the Commission has used in the past for evaluating the spectral efficiency of channels that will likely be used for two way dispatch operations. For channels that are or will be licensed in a contiguous manner, the Joint Commenters urge the Commission to adopt a more flexible approach to determining if a licensee proposes to use a system that demonstrates spectral efficiency.

**WHEREFORE, THE PREMISES CONSIDERED,** the Joint Commenters submit the following Supplemental Comments and ask that the Commission act in a manner consistent herewith.

**COMTECH, INC.**

By: Terry Nelson  
Name: TERRY NELSON  
Title: CEO

**KINGDON R. HUGHES**

Dated: October 28, 1996

**GLOBAL CELLULAR CORP.**

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**OVERALL WIRELESS COMM. CORP.**

By Gerald McGowan  
Lukas, McGowan, Nace & Gutierrez  
Its Counsel

WHEREFORE, THE PREMISES CONSIDERED, the Joint Commenters submit the following Supplemental Comments and ask that the Commission act in a manner consistent herewith.

COMTECH, INC.

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

KINGDON R. HUGHES

GLOBAL CELLULAR CORP.

By: *[Signature]*

Name: Gus Wirth Jr

Title: Vice President

OVERALL WIRELESS COMM. CORP.

By George L. Lyon, Jr.  
Lukas, McGowan, Nace & Gutierrez  
Its Counsel

10/28/96 14:01

10-28-1996 12:41PM FROM RUSH NETWORK CORP. 972 669 7873

10/28/96 12:40

10/28/96 MON 12:13 FAX 202 288 1504

GARDNER, LARSON & DOUGLAS

NO. 633 003  
P. 3

NO. 632 002

**WHEREFORE, THE PREMISES CONSIDERED, the Joint Commenters**

submit the following Supplemental Comments and ask that the Commission act in a manner consistent herewith.

**COMTECH, INC.**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**RUSH NETWORK CORP.**

By: *L.R. Hughes*

Name: LINDSON R. HUGHES

Title: PRES.

**GLOBAL CELLULAR CORP.**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**OVERALL WIRELESS COMM. CORP.**

By *George L. Lyon, Jr.*  
Lukas, McGowan, Nace & Gutierrez  
Its Counsel

Dated: October 28, 1996

## CERTIFICATE OF SERVICE

I, Donna B. Fleming, a secretary in the law firm of Gardner, Carton & Douglas, certify that I have this 28th day of October, 1996, caused to be sent by hand delivery, a copy of the foregoing **Joint Supplemental Comments** to the following:

Commissioner Reed Hundt  
Federal Communications Commission  
1919 M Street, NW, Room 814  
Washington, D.C. 20554

Commissioner Rachelle Chong  
Federal Communications Commission  
1919 M Street, NW, Room 826  
Washington, D.C. 20554

Commissioner Susan Ness  
Federal Communications Commission  
1919 M Street, NW, Room 832  
Washington, D.C. 20554

Commissioner James Quello  
Federal Communications Commission  
1919 M Street, NW, Room 802  
Washington, D.C. 20554

Michele Farquhar  
Chief, Wireless Telecommunications Bureau  
Federal Communications Commission  
2025 M Street, NW, Room 5002  
Washington, D.C. 20554

Jackie Chorney, Legal Advisor to Commissioner Reed Hundt  
Federal Communications Commission  
1919 M Street, NW, Room 814  
Washington, D.C. 20554

Suzanne Toller, Legal Advisor to Commissioner Rachelle Chong  
Federal Communications Commission  
1919 M Street, NW, Room 826  
Washington, D.C. 20554

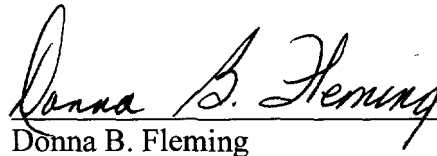
David Siddall, Legal Advisor to Commissioner Susan Ness  
Federal Communications Commission  
1919 M Street, NW, Room 832  
Washington, D.C. 20554

Rudolpho Baca, Legal Advisor to Commissioner James Quello  
Federal Communications Commission  
1919 M Street, NW, Room 802  
Washington, D.C. 20554

John Cimko  
Policy Division  
Wireless Telecommunications Bureau  
Federal Communications Commission  
2025 M Street, NW, Room 5202  
Washington, D.C. 20554

Martin Liebman  
Policy Division  
Wireless Telecommunications Bureau  
Federal Communications Commission  
2025 M Street, NW, Room 5202  
Washington, D.C. 20554

Elizabeth Lyle  
Wireless Telecommunications Bureau  
Federal Communications Commission  
2025 M Street, NW., Room 5202  
Washington, D.C. 20554

  
Donna B. Fleming